Component of Statistics Canada Catalogue no. 82-003-X
Health Reports

Article

Self-reported financial barriers to care among patients with cardiovascular-related chronic conditions

by David J.T. Campbell, Kathryn King-Shier, Brenda R. Hemmelgarn, Claudia Sanmartin, Paul E. Ronksley, Robert G. Weaver, Marcello Tonelli, Deidre Hennessy and Braden J. Manns

Release Date: May 2014

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..	not available for a specific reference period
...	not applicable
0	true zero or a value rounded to zero
0^s	value rounded to 0 (zero) where there is a meaningful distinction between true zero and the value that was rounded
^{p}	preliminary
^{r}	revised
x	suppressed to meet the confidentiality requirements of the *Statistics Act*
^{E}	use with caution
F	too unreliable to be published
*	significantly different from reference category ($p < 0.05$)

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Abstract

Background

People with chronic conditions who do not achieve therapeutic targets have a higher risk of adverse health outcomes. Failure to meet these targets may be due to a variety of barriers. This article examines self-reported financial barriers to health care among people with cardiovascular-related chronic conditions.

Data and methods

A population-based survey was administered to western Canadians with cardiovascular-related chronic conditions (n = 1,849). Associations between self-reported financial barriers and statin use, the likelihood of stopping use of prescribed medications, and emergency department visits or hospitalizations were assessed.

Results

More than 10% respondents reported general financial barriers (12%) and lack of drug insurance (14%); 4% reported financial barriers to accessing medications. Emergency department visits or hospitalizations were 70% more likely among those reporting a general financial barrier. Those reporting a financial barrier to medications were 50% less likely to take statins and three times more likely to stop using prescribed medications. Individuals without drug insurance were nearly 30% less likely to take statins.

Interpretation

In this population, self-reported financial barriers were associated with lower than recommended medication use and increased likelihood of emergency department visits or hospitalization.

Keywords

Health insurance, health services accessibility, socio-economic factors, socio-economic status

Authors

David J.T. Campbell, Kathryn King-Shier, Brenda Hemmelgarn, Robert Weaver, and Braden Manns are with the University of Calgary, Calgary, Alberta. Paul Ronksley is with the Ottawa Hospital Research Institute, Ottawa, Ontario. Claudia Sanmartin and Deirdre Hennessy are with the Health Analysis Division at Statistics Canada, Ottawa, Ontario. Marcello Tonelli is with the University of Alberta, Edmonton, Alberta.

Even in a system with universal health care, financial barriers may reduce access to medical care and can affect health outcomes. Because many provincial health insurance plans do not cover prescription drugs for all citizens,[1] some patients may not obtain prescribed medications.[2] Even those with drug coverage may still bear financial burdens, such as copayments and deductibles.[3]

Financial barriers may be especially important for people with cardiovascular-related chronic conditions, who typically require ongoing monitoring and long-term use of costly prescription medications.[4,5] People with lower socio-economic status[6,7] are particularly vulnerable to experiencing poor health outcomes.[8,9]

Earlier research has examined the affordability of health care in Canada, including types of provincial drug coverage,[10] out-of-pocket expenditures,[1] and cost-related non-adherence.[2] Several studies indicate that provision of drug insurance, particularly to people with cardiovascular conditions, increases the use of preventive medications.[11-14] Others have shown that such insurance is associated with improved clinical outcomes, for instance, with respect to blood pressure[14] and cardiac events.[3] Some studies also suggest that the outcome of insurance provision may be reduced costs in other health care areas, such as emergency department visits and hospitalizations.[13] However, relationships between different types of financial barriers and care indicators or adverse outcomes in patients with chronic conditions are not clear.

A survey conducted in the four western provinces collected data on self-reported financial barriers to health care among adults who reported that they had been diagnosed with hypertension, diabetes, heart disease and/or stroke. The goals were to determine the prevalence of various types of self-reported financial barriers, factors associated with experiencing these barriers, and their implications. The present analysis sought to determine if self-reported financial barriers were associated with lower use of guideline-recommended medications, stopping use of one or more recommended medications, and greater out-of-pocket expenditures. The association between self-reported financial barriers and chronic condition-related emergency department visits and hospitalization was also assessed.

Data and methods

Survey design

From February 1 to March 31 2012, Statistics Canada conducted a survey designed by the Interdisciplinary Chronic Disease Collaboration[15]—"Barriers to Care for People with Chronic Health Conditions" (BCPCHC)[16]—using computer-assisted telephone interviews. The survey collected information about aspects of care and potential barriers, including financial barriers, access barriers, geographical barriers, and health-care-system-related barriers among people with at least one of four cardiovascular-related chronic conditions. With respondent consent, their BCPCHC responses were linked to their 2011 Canadian Community Health Survey (CCHS) responses to provide detailed information about hospitalizations and socio-demographic and health characteristics.

The present study was approved by the Conjoint Health Research Ethics Board of the University of Calgary and the Health Research Ethics Board of the University of Alberta. In accordance with Statistics Canada procedures, the survey underwent pilot testing and multiple revisions to ensure that the questionnaire content was relevant to the patient population.[16]

Respondents

The initial sampling frame for the BCPCHC consisted of all 2011 CCHS respondents who: (1) resided in British Columbia, Alberta, Saskatchewan or Manitoba; (2) were aged 40 or older; and (3) self-reported having at least one of heart disease, stroke, diabetes, or hypertension.

Of an initial 4,331 CCHS respondents, 2,582 were considered "in scope" for the BCPCHC; that is, they had not participated in another Statistics Canada CCHS sub-survey in 2011; they confirmed that they had a cardiovascular-related chronic condition; and they agreed to have their BCPCHC results linked to their CCHS responses. From this sampling pool, 2,316 were randomly selected for the BCPCHC. The response rate was 80%, yielding a final study population of 1,849.

Variables

Three types of self-reported *financial barriers* were examined: general financial barriers (difficulty paying for services, equipment or medications); financial barriers to accessing medications (not obtaining medications because of cost); and lack of insurance coverage for prescription medications (Appendix).

Respondents were asked if they used *statins* and *acetylsalicylic acid (Aspirin/ASA)* regularly in the past month. These drugs are recommended for most patients at high risk of cardiovascular events.[17,18] Compared with ASA (about $50 a year), statins are relatively expensive ($500 to $700 a year[19]), so patients reporting financial barriers may be less likely to use them on a daily basis. ASA use was selected as a secondary outcome and negative control; it was hypothesized that financial barriers would be less relevant for the use of ASA than for the use of statins. Therefore, people with cardiovascular-related chronic conditions who were not using ASA might have reasons other than cost for non-use.

To identify respondents who, ideally, should be taking these medications, a subset of the total study population at higher cardiovascular risk was defined using an algorithm modified from the Canadian Diabetes Association (CDA) practice guidelines[17] and Canadian Hypertension Education Program (CHEP) recommendations.[18] Although some of the clinical information needed to make this determination (for instance, blood pressure control, family history, symptoms) was lacking, available data were used to generate a high-risk cohort. This was comprised of people who self-reported having heart disease or stroke; those who had both hypertension and diabetes; current smokers; those with hypertension only who were aged 55 or older; and those with diabetes only who were aged 45 or older (men) or 50 or older (women).

Non-adherence to prescribed medication was defined as respondents reporting that they had stopped taking one or more of their medications for at least one week in the past 12 months.

Respondents reported their estimated 12-month *out-of-pocket expenses for medications*. The estimate was extrapolated from a three-month recall if this was easier for the respondent than recalling the total amount over 12 months.

Respondents were asked if, in the past 12 months, they had visited an *emergency department* or been *hospitalized* for care of their cardiovascular-related chronic condition. Their answers were used to derive a binary variable differentiating those who had had an emergency department visit or who had spent at least one night in hospital from those who did neither.

Based on the literature, a list of potential covariates was generated to identify variables that were theoretical confounders (potentially independently associated with both the exposure and the outcome): age, sex, multimorbidity (having more than one of the four selected chronic conditions), having a regular family physician, and selected socio-demographic characteristics. Because multidisciplinary teams have been shown to improve the quality of care for people with chronic conditions,[20] the models also controlled for involvement of a non-physician health care provider.

Statistical analyses

All analyses were performed using STATA 11.0 (Statacorp, College Station, Texas). Frequency weights were calculated by Statistics Canada to account for non-representative sampling and to reflect the adult population with chronic conditions in the four western provinces.[21] All percentages and models used these weights, and proportions were stratified by the presence of multimorbidity. Bootstrapping procedures with 500 replications were used to calculate standard errors and confidence intervals around the estimates. As recommended by Statistics Canada, the coefficient of variation was used to determine the reliability of reported percentages.[22]

Log-binomial regression models were used to calculate unadjusted and adjusted prevalence rate ratios (PRR), using a stepwise approach. Initially, bivariate models

were generated to test independent associations between the covariate and outcome of interest. Each covariate that was significant in bivariate modelling was then tested in simplified models that included the covariate of interest, the exposure, and the outcome. If the covariate was a potential confounder (change in point estimate of at least 10%), it was included in the full model. The final model was obtained through a process of backwards elimination. Covariates with p-values > 0.10 on the Wald test were removed sequentially; if there was no evidence of confounding (point estimate did not change by at least 10%), the variable was eliminated from the model. Each variable in Table 1 was considered a possible confounder and tested in this way. In addition, joint confounding and effect measure modification were assessed using modelling with interaction terms between lack of drug insurance and province, lack of drug insurance and age, and multimorbidity and age.

Table 1
Percentage distribution of selected socio-demographic and health characteristics, by number of chronic conditions, household population aged 40 or older,[†] Manitoba, Saskatchewan, Alberta and British Columbia, 2012

	Number of chronic conditions								
	Total			One			Two or more		
		95% confidence interval			95% confidence interval			95% confidence interval	
Characteristics	%	from	to	%	from	to	%	from	to
Total	100.0	...	...	67.8	64.8	70.8	32.2	29.2	35.2
Sex									
Men	49.9	46.0	53.8	47.9	43.1	52.7	54.2	48.0	60.4
Women	50.1	46.2	54.0	52.1	47.3	56.9	45.8	39.6	52.0
Age group (years)									
40 to 64	48.8	45.7	52.1	54.4	50.3	58.5	37.2	31.1	43.4
65 to 74	26.9	23.9	29.8	25.4	21.7	29.0	30.0	24.7	35.4
75 or older	24.3	21.5	27.0	20.2	16.9	23.6	32.7	27.0	38.4
Marital status									
Married/Common-law	66.9	63.2	70.6	69.2	64.7	73.7	62.2	56.6	67.8
Widowed/Separated/Divorced/Never married	33.1	29.4	36.8	30.8	26.3	35.3	37.8	32.2	43.4
Ethnicity									
White	86.7	83.5	89.9	87.3	83.2	91.4	85.4	80.6	90.1
Aboriginal	4.2	2.9	5.5	3.3	1.8	4.9	6.0	3.3	8.7
Other	9.1	6.0	12.2	9.4	5.3	13.4	8.7	4.6	12.7
Education									
Less than secondary graduation	21.3	18.6	24.1	18.7	15.5	21.9	26.8	21.6	32.0
Secondary graduation/Some postsecondary	22.0	18.9	25.1	22.3	18.3	26.2	21.5	16.2	26.8
Postsecondary graduation (less than bachelor's degree)	37.7	33.9	41.5	37.1	32.2	42.0	38.8	33.0	44.6
Bachelor's degree or higher	19.0	15.6	22.4	21.9	17.3	26.5	12.9	9.1	16.7
Household income									
Less than $30,000	21.8	18.9	24.7	18.5	15.2	21.8	28.6	23.1	34.1
$30,000 to $54,999	27.4	24.3	30.4	23.8	20.2	27.3	34.9	29.5	40.4
$55,000 to $94,999	24.9	21.5	28.4	27.0	22.4	31.6	20.6	15.7	25.4
$95,000 or more	26.0	22.3	29.6	30.7	25.8	35.6	15.9	11.4	20.4
Location									
Urban	82.5	79.5	85.4	82.9	79.1	86.6	81.7	77.5	85.9
Rural	17.5	14.6	20.5	17.1	13.4	20.9	18.3	14.1	22.5
Province of residence									
British Columbia	44.5	41.3	47.7	43.8	39.2	48.4	46.0	40.7	51.3
Alberta	31.7	28.8	34.6	33.9	29.8	37.9	27.0	22.5	31.6
Saskatchewan	10.8	9.4	12.1	9.7	8.0	11.5	13.0	9.7	16.2
Manitoba	13.0	11.1	15.0	12.6	9.9	15.4	14.0	10.1	17.9
Body mass index category (corrected for self-report bias[‡])									
Normal/Underweight (less than 25)	23.3	19.8	26.7	24.7	20.3	29.2	20.0	14.7	25.4
Overweight (25 to 29.9)	36.7	32.5	40.8	38.0	32.9	43.2	33.7	27.6	29.9
Obese (30 or more)	40.1	36.2	44.0	37.2	32.2	42.3	46.2	40.1	52.3
Health literacy									
Adequate	84.8	81.9	87.7	89.0	86.0	92.0	75.7	70.0	81.5
Inadequate	15.2	12.3	18.1	11.0	8.0	14.0	24.3	18.5	30.0

[†] reported diagnosis of diabetes, heart disease, hypertension and/or stroke
... not applicable
Source: 2012 Barriers to Care for People with Chronic Health Conditions Survey

What is already known on this subject?

- Despite Canada's universal health care system, patients may perceive financial barriers when seeking care.
- Perceived financial barriers may be especially important for people with cardiovascular-related chronic conditions.
- Several studies have examined the cost of medical care in Canada, but relationships between different types of financial barriers and health care indicators or adverse outcomes in patients with chronic conditions are not clear.

What does this study add?

- Perceived financial barriers were relatively common among people with cardiovascular-related chronic conditions.
- Patients who reported financial barriers were less likely to use statins, more likely to stop using prescribed medications, and more likely to have an emergency department visit or hospitalization related to their cardiovascular-related chronic condition.

Results

Study population

Just over half (52%) of BCPCHC respondents were aged 65 or older; two-thirds (67%) were married; and a large majority (83%) lived in urban areas (Table 1). Respondents who had more than one of the selected cardiovascular-related conditions (multimorbidity) were more likely to be men, to live in lower-income households, and to have relatively low levels of education.

Prevalence of self-reported barriers

An estimated 12% of respondents reported general financial barriers to health care; 4% reported financial barriers specifically to accessing medications; and 14% lacked prescription drug insurance (Table 2).

The prevalence of self-reported financial barriers varied by the number of chronic conditions respondents reported. Compared with people who had just one condition, those with at least two were more likely to report general financial barriers (PRR: 2.7; 95% CI: 1.7-4.2) and financial barriers to accessing medications (PRR: 7.6; 95% CI: 2.7-21.7), but they were no more likely to lack drug insurance (PRR: 1.0; 95% CI: 0.7-1.4) (Table 2).

Several patient factors were associated with reporting general financial barriers and lacking drug insurance (Table 3). Lower income, obesity, and non-White ethnicity were each associated with general financial barriers. Living in a rural area or in a province other than Alberta was associated with not having drug insurance.

Medication use

Almost half (48%) of respondents were using statins (Table 4). The prevalence of statin use was similar among people who did and did not report general financial barriers (Table 5). However, those who reported difficulty accessing medications because of cost were 50% less likely to be taking statins (adjusted PRR 0.5; 95% CI: 0.3-0.9), compared with those who did not report this difficulty. People without drug insurance were nearly 30% less likely to take statins (adjusted PRR 0.7; 95% CI: 0.6-0.9) than were those with drug insurance.

When the influence of all the variables in the analysis was taken into account, none of the three types of self-reported financial barriers was associated with ASA use (Table 5).

An estimated 13% of respondents had stopped taking one or more prescription medications (Table 4).

A financial obstacle to accessing medications was the only barrier associated with having stopped using prescribed

Table 2
Prevalence of self-reported financial barriers to receipt of health care services, by type of barrier and number of chronic conditions, household population aged 40 or older,† Manitoba, Saskatchewan, Alberta and British Columbia, 2012

	Number of chronic conditions									Comparison (one versus two or more conditions)		
	Total			One			Two or more					
		95 % confidence interval			95 % confidence interval			95 % confidence interval			95 % confidence interval	
Type of barrier	%	from	to	%	from	to	%	from	to	Prevalence rate ratio	from	to
General financial barrier	12.0	9.3	14.7	7.8E	4.9	10.7	20.9E	15.7	26.2	2.7	1.7	4.2
Financial barrier to medications	3.9E	2.2	5.6	F	..	..	9.5E	4.8	14.2	7.6	2.7	21.7
Lack of prescription drug insurance	14.1	11.2	17.0	14.2	10.3	18.0	13.9	10.0	17.7	1.0	0.7	1.4

† reported diagnosis of diabetes, heart disease, hypertension and/or stroke
E interpret with caution
F too unreliable to be published
.. not applicable
Source: 2012 Barriers to Care for People with Chronic Health Conditions Survey

medications for more than a week in the past year (adjusted PRR: 3.5; 95% CI: 1.7-7.3) (Table 5).

Out-of-pocket drug expenditures

Mean annual out-of-pocket drug expenditures amounted to $539 (Table 6), but were significantly higher for people with more than one chronic condition ($714 versus $460). However, this difference was concentrated among seniors; for people younger than age 65, out-of-pocket drug expenditures did not differ significantly by the number of cardiovascular-related conditions they reported.

Compared with people who reported no barriers, those who reported general financial barriers had significantly higher out-of-pocket expenditures on medications ($466 versus $1,077, p = 0.004) (Table 4). And compared with those who had drug insurance, those who did not reported higher out-of-pocket spending on medications ($480 versus $894, p = 0.003)

Among people reporting financial barriers to medications specifically, the trend was toward higher out-of-pocket expenditures, compared with people who did not report such barriers ($900 versus $524). The difference, however, was not statistically significant (p = 0.139), likely because of the small number of respondents identifying this barrier.

Table 3
Prevalence rate ratios associating selected socio-demographic and health factors with self-reported general financial barriers and lack of drug insurance, household population aged 40 or older,† Manitoba, Saskatchewan, Alberta and British Columbia, 2012

	General financial barrier						Lack of drug insurance					
	Prevalence			Unadjusted prevalence rate ratio (PRR)			Prevalence			Unadjusted prevalence rate ratio (PRR)		
		95 % confidence interval			95 % confidence interval			95 % confidence interval			95 % confidence interval	
Characteristics	%	from	to	PRR	from	to	%	from	to	PRR	from	to
Sex												
Women‡	11.7	8.6	14.8	...	...	...	13.0	9.7	16.3	...	...	...
Men	12.3	7.9	16.6	1.0	0.7	1.6	15.1	10.6	20.0	1.2	0.8	1.7
Age (years)												
Younger than 65‡	11.8E	7.4	16.1	...	...	...	14.3E	9.5	19.1	...	...	...
65 to 74	13.5E	8.8	18.2	1.1	0.7	1.9	11.2E	7.5	14.9	0.8	0.5	1.3
75 or older	10.8E	7.2	14.4	0.9	0.6	1.5	16.8	11.9	21.7	1.2	0.8	1.8
Ethnicity												
White‡	10.7	8.4	12.9	...	...	...	14.9	11.7	18.1	...	...	...
Aboriginal/Other	21.1E	8.5	33.6	2.0*	1.0	3.9	8.7E	3.2	14.2	0.6	0.3	1.1
Education												
Less than secondary graduation‡	14.0	9.6	18.4	...	...	...	14.2	9.8	18.6	...	...	...
Secondary graduation or more	11.4	8.3	14.6	0.8	0.5	1.2	14.0	10.5	17.6	1.0	0.7	1.5
Household income												
Less than $30,000‡	21.7	15.1	28.4	2.3*	1.5	3.6	15.7	11.5	19.9	1.2	0.8	1.6
$30,000 or more	9.4	9.5	12.2	...	...	...	13.6	10.2	17.0	...	...	...
Location												
Urban‡	12.6	9.5	15.7	...	...	...	12.6	9.7	15.5	...	...	...
Rural	9.1E	5.2	13.0	0.7	0.4	1.2	21.3E	12.6	30.0	1.7*	1.1	2.8
Province												
Alberta‡	9.7E	6.3	13.1	...	...	...	6.5E	3.2	9.9	...	...	...
Manitoba/Saskatchewan/British Columbia	13.1	9.5	16.7	1.4	0.9	2.1	17.6	13.7	21.1	2.7*	1.5	4.8
Body mass index (kg/m²)(corrected for self-report§)												
Less than 30 kg/m²‡	9.0	6.3	11.7	...	...	...	15.8	11.2	20.3	...	...	...
30 kg/m² or more	17.0	12.0	22.1	1.9	1.3	2.9	12.0	8.5	15.5	0.8	0.5	1.2
Health literacy[1]												
Adequate‡	10.7E	7.8	13.5	...	...	...	13.8	10.6	17.0	...	...	...
Inadequate	20.2E	12.3	28.1	1.9*	1.2	3.1	16.2E	9.2	23.3	1.2	0.7	1.9
Regular family doctor												
Yes	11.3	9.0	13.6	0.4	1.0	1.9	13.8	10.9	16.8	0.7	0.4	1.5
No‡	F	...	...	...	...	...	F	...	...	...	...	...

† reported diagnosis of diabetes, heart disease, hypertension and/or stroke
‡ reference category
* significantly different from reference category
E interpret with caution
F too unreliable to be published
Source: 2012 Barriers to Care for People with Chronic Health Conditions Survey

Emergency department visits and hospitalization

Overall, 9% of respondents reported an emergency department visit or hospitalization related to their cardiovascular condition in the past year (Table 4). Emergency department visits or hospitalizations were 70% more likely among those who reported a general financial barrier (adjusted PRR: 1.7; 95% CI: 1.0-2.3) than among those who did not (Table 5). However, self-reported financial barriers to medications or lacking drug insurance were not associated with an increased risk of an emergency department visit/hospitalization. Interaction terms between multimorbidity and age, province and age, and province and insurance status were not significant in any of the models.

Discussion

In the four western provinces, reporting general barriers to health care and lacking drug insurance were relatively common among people aged 40 or older with cardiovascular-related chronic conditions (12% to 14%).

A Commonwealth Fund/Health Council of Canada[25] survey found a similar percentage of people with chronic conditions reporting financial barriers. The results of the BCPCHC survey provide additional information about health outcomes. Reporting financial barriers seemed to be clinically relevant, as indicated by the 70% increased likelihood of a chronic-condition-related hospitalization or emergency department visit. This increased risk may be the result of a lack of access to preventive measures, such as monitoring, screening, educational programs and treatments, due to the direct or incidental costs of these services. The findings of the present study are consistent with those of earlier Canadian and American research reporting that ambulatory-care-sensitive hospital admissions are more common among people with limited financial resources.[26,27]

Living in a rural location was significantly associated with not having drug insurance. This association may reflect a greater tendency for people in these areas to be self-employed or to work for small businesses that do not provide extended health benefits.

Compared with people who had drug insurance, those who did not were 30% less likely to use statins. People who reported a financial barrier to accessing medications were 50% less likely than those who did not to use statins. These differences may be related to the annual costs of statin use, which range from $500 to $700.[19] By contrast, use of ASA (a much less expensive medication) did not vary by the perception of financial barriers. The disparity lends further support to the hypothesis that non-use of statins may be related to finances rather than to other unmeasured factors (for instance, an aversion to taking medications), and is similar to what has been noted in other Canadian studies of initiation of statin therapy.[28]

Overall, people without drug insurance had mean annual out-of-pocket medication expenses of $894, compared with $480 for people who had drug insurance. However, individuals who did not have drug insurance were no more likely to report an emergency room visit or hospitalization.

Several characteristics were significantly associated with reporting financial barriers—multimorbidity, non-White

Table 4
Quality indicators and out-of-pocket drug expenditures, by type of self-reported financial barrier, household population aged 40 or older,† Manitoba, Saskatchewan, Alberta and British Columbia, 2012

	Quality indicator															
	Appropriate statin use			Appropriate ASA use			Stopped taking prescribed medication			Chronic-disease-related hospitalization or emergency department visit			Mean out-of-pocket drug expenditures			
		95 % confidence interval			95 % confidence interval			95 % confidence interval			95 % confidence interval			95 % confidence interval		
Type of barrier	%	from	to	%	from	to	%	from	to	%	from	to	$	from	to	p-value
Total	48.2	44.1	52.3	49.2	45	53.4	12.9	9.9	15.9	9.2	7.2	11.3	539	474	605	...
General financial barrier																
Yes	52.5	40.6	64.5	52.6	40.7	64.5	19.8E	9.9	29.7	17.4E	10.4	24.5	1,077	666	1,488	p = 0.004
No	47.6	43.3	51.9	48.7	44.1	53.2	12.0	8.8	15.2	7.8	5.6	10.1	466	412	521	
Financial barrier to medications																
Yes	F	...	...	71.3	49.5	93.1	37.7E	14.7	60.7	F	...	...	900	408	1392	p = 0.139
No	49.3	45.2	53.4	48.2	43.9	52.4	11.9	8.8	14.9	8.7	6.6	10.8	524	457	591	
Drug insurance																
Yes	50.1	45.6	54.6	50.4	45.9	54.9	12.9	9.6	16.2	9.1	6.9	11.3	480	412	548	p = 0.003
No	36.2	27.1	45.4	41.4	32	50.9	13.3E	6.5	20.1	8.2	3.3	13.1	894	639	1,149	

† reported diagnosis of diabetes, heart disease, hypertension and/or stroke
E interpret with caution
F too unreliable to be published
... not applicable
Source: 2012 Barriers to Care for People with Chronic Health Conditions Survey

ethnicity (including Aboriginal), and an annual household income less than $30,000. Age was not a significant modifier or confounder in any model. This may be due to a dilution of effect, because Alberta is the only province with differential insurance coverage for people aged 65 or older; seniors in the other three western provinces receive no additional benefits. (Provisions of the public drug programs in the western provinces are outlined in Appendix Text Table A.).

Table 5
Unadjusted and adjusted associations between self-reported financial barriers and quality indicators, household population aged 40 or older,† Manitoba, Saskatchewan, Alberta and British Columbia, 2012

	Prevalence rate ratio (PRR)					
	Unadjusted			Adjusted		
		95 % confidence interval			95 % confidence interval	
Quality indicator/Type of barrier	PRR	from	to	PRR	from	to
Appropriate statin use						
General financial barrier	1.1	0.9	1.4	1.0‡	0.8	1.2
Financial barrier to medications	0.5	0.3	1.0	0.5‡*	0.3	0.9
Lack of drug insurance	0.7	0.6	0.9	0.7‡*	0.6	0.9
Appropriate ASA use						
General financial barrier	1.1	0.8	1.4	1.0‡	0.8	1.2
Financial barrier to medications	1.5	1.0	2.1	1.3§	0.9	1.8
Lack of drug insurance	0.8	0.7	1.1	0.8‡	0.7	1.0
Stopped taking prescribed medication						
General financial barrier	1.7	0.9	3.1	1.7††	0.9	3.1
Financial barrier to medications	3.2	1.2	6.7	3.5††*	1.7	7.3
Lack of drug insurance	1.0	0.6	1.9	1.1††	0.6	2.0
Chronic-disease-related hospitalization or emergency department visit						
General financial barrier	2.2	1.3	3.8	1.7‡*	1.0	2.9
Financial barrier to medications	1.8	0.8	4.4	1.1‡	0.5	2.8
Lack of drug insurance	0.9	0.5	1.8	0.9‡	0.5	1.7

† reported diagnosis of diabetes, heart disease, hypertension and/or stroke
* significantly different from reference category
‡ adjusted for age, sex and multimorbidity
§ adjusted for sex and multimorbidity
†† adjusted for age, sex and health literacy
Note: Reference category is absence of barrier.
Source: 2012 Barriers to Care for People with Chronic Health Conditions Survey

Table 6
Mean out-of-pocket drug expenditures, by number of chronic conditions and age group, household population aged 40 or older,† Manitoba, Saskatchewan, Alberta and British Columbia, 2012

	Number of chronic conditions									
	Total			One			Two or more			
		95 % confidence interval			95 % confidence interval			95 % confidence interval		Comparison (one versus two or more conditions)
	$	from	to	$	from	to	$	from	to	
Total	539	474	605	460	375	546	714	613	814	p < 0.001
65 or older	631	562	700	533	447	620	782	668	897	p = 0.001
Younger than 65	453	345	562	406‡	272	540	606	450	763	p = 0.06

† reported diagnosis of diabetes, heart disease, hypertension and/or stroke
‡ interpret with caution
Source: 2012 Barriers to Care for People with Chronic Health Conditions Survey

Limitations

This study has several limitations. BCPCHC data were self-reported and subject to the accompanying limitations. Despite adjustment, the potential for residual confounding exists, and differences in outcomes between groups may be related to unmeasured patient differences. For most variables, covariates were stratified into only two groups, and some detail may have been lost. Moreover, some subgroups were small, thereby limiting the statistical power to detect differences. Further, the lack of data on blood pressure control and chronic condition severity may have resulted in misclassification of the need for statins or ASA. The survey lacks the sensitivity to identify respondents who choose to prioritize medications and spend less on other necessities such as food.[29] Finally, the survey was administered only to residents of the four western provinces, which potentially limits the generalizability of the findings.

Conclusion

Lack of drug coverage and general perceived cost barriers were reported by more than one in ten adults in western Canada with cardiovascular-related chronic conditions. These barriers were associated with lower use of guideline-recommended medications, an increased likelihood of non-adherence, and an increased likelihood of hospitalizations or emergency department visits. Because those who reported financial barriers comprised a heterogeneous group, and because the relationship between general financial barriers and increased risk of hospitalization is not clear, further research is warranted to better understand the association. ■

Acknowledgements

This research was supported by an interdisciplinary team grant from Alberta Innovates–Health Solutions, the Interdisciplinary Chronic Disease Collaboration (ICDC), which is funded through the AHFMR Interdisciplinary

Team Grants Program. AHFMR is now Alberta Innovates–Health Solutions (AI-HS). David J.T. Campbell is supported by an AI-HS Clinician Fellowship award. Braden J. Manns, Kathryn King-Shier and Brenda R. Hemmelgarn are supported by AI-HS salary awards. Brenda R. Hemmelgarn is also supported by the Roy and Vi Baay Chair in Kidney Research. Paul E. Ronksley is supported by a Frederick Banting and Charles Best Canada Graduate Scholarship from the Canadian Institutes of Health Research. Marcello Tonelli is supported by a Canada Research Chair. Braden J. Manns, Brenda R. Hemmelgarn and Marcello Tonelli were supported by an alternative funding plan from the Government of Alberta and the Universities of Alberta and Calgary.

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Appendix

Barriers to Care for People with Chronic Health Conditions Survey questions

Exposures/Financial barriers

Perceived general financial barrier
- "In the past 12 months, how often did you have difficulty paying for services, equipment, medications for chronic conditions?"
  - Yes = always, often, sometimes
  - No = rarely, never

Financial barrier to drugs
- "In the past 12 months, how often were you unable to access medications for your chronic condition due to cost?"
  - Yes = always, often, sometimes
  - No = rarely, never

Lack of drug insurance
- "Do you currently have insurance that covers all or part of the cost of prescription medications?"

Quality indicators

Use of statins
- "In the past month, did you take prescription medication such as Crestor, Lipitor or Zocor to control blood cholesterol?"

Use of acetylsalicylic acid (ASA)
- "In the past month, did you take aspirin or other ASA (acetylsalicylic acid) medication every day or every second day?"

Adherence to prescribed medication
- "Over the past 12 months, have you ever stopped taking one or more of your drugs as prescribed for a week or more?"

Out-of-pocket expenditures
- "In the past 12 months, what were the out-of-pocket costs for your prescribed medicines, drugs and pharmaceutical products? Estimate the costs incurred by you. Include amounts not covered by insurance, such as exclusions, deductibles and expenses over limits. Exclude payments for which you have been or will be reimbursed. If it is easier for you, estimate your out-of-pocket costs in a 3-month period."

Chronic-disease-related emergency room visit
- "How many times have you personally used a hospital emergency department for your condition in the past 12 months?"

Chronic-disease-related hospital admission
- "In the past 12 months, have you been a patient overnight in a hospital for your condition?"

Covariates

Regular medical doctor
- "Do you have a regular medical doctor?"

Self-perceived health
- "In general, would you say your health is . . . ?"
  - At least very good = excellent, very good
  - Less than very good = good, fair, poor

Self-perceived mental health
- "In general, would you say your mental health is . . . ?"
  - At least very good = excellent, very good
  - Less than very good = good, fair, poor

Inadequate health literacy
- Imputed variable based on validated 3-item questionnaire [24]

Text Table A
Characteristics of drug insurance plans, by patient type and income, Manitoba, Saskatchewan, Alberta and British Columbia

Patient type, income, province	Characteristics of drug plan			
	Universal coverage	Copayment	Catastrophic coverage	Deductible (% of household income)
General public younger than 65				
Higher income				
Manitoba	✓	✗	✓	4.6% to 6.1%
Saskatchewan	✓	Up to 35%	✓	3.4%
Alberta	✗		✗	
British Columbia	✓	30%	✓	3%
Lower income				
Manitoba	✓	✗	✓	2.4% to 4.3%
Saskatchewan	✓	Up to 35%	✓	3.4%
Alberta	✗		✗	
British Columbia	✓	30%	✓	0 to 2%
Seniors (65 or older)				
Higher income				
Manitoba	✓	✗	✓	4.6% to 6.1%
Saskatchewan	✓	Up to 35%	✓	3.4%
Alberta	✓	30% to max. $25	✗	✗
British Columbia	✓	30%	✓	3%
Lower income				
Manitoba	✓	✗	✓	2.4% to 4.3%
Saskatchewan	✓	$15	✗	
Alberta	✓	30% to max. $25	✗	✗
British Columbia	✓	30%	✓	0 to 2%
Social assistance beneficiaries				
Manitoba	✓	✗	✗	✗
Saskatchewan	✓	✗	✗	✗
Alberta	✓	✗	✗	✗
British Columbia	✓	✗	✗	✗

✗ province does not have this feature
✓ province has this feature
.. not applicable
Source: Daw and Morgan.[41]